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AN INAUGURAL

John

DISSERTATION

ON THE

CAUSES which produce a PREDISPOSITION TO

PHTHISIS PULMONALIS,

AND THE

METHOD OF OBVIATING THEM;

Submitted to the Examination of the Rev. WILLIAM SMITH,
S. T. P. Provost, the TRUSTEES and MEDICAL PROFESSORS
of the COLLEGE of PHILADELPHIA,

FOR THE DEGREE OF DOCTOR OF MEDICINE,

ON THE TWENTY-SECOND DAY OF OCTOBER, 1790.

1825

BY FRANCIS-BOWES SAYRE, M. B.

OF TRENTON,

Senior Member of the American Medical Society, and Member
of the Medical Society of New-Jersey.

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T O

BENJAMIN RUSH, M. D.

PROFESSOR OF THE PRACTICE OF PHYSIC

I N T H E

COLLEGE OF PHILADELPHIA, &c. &c.

T H I S

D I S S E R T A T I O N

I S

RESPECTFULLY INSCRIBED,

B Y H I S

MUCH OBLIGED FRIEND AND

PUPIL,

T H E A U T H O R.

2. The first part of the paper is devoted to the study of the

properties of the

operator

defined by

where \mathcal{H} is a Hilbert space and \mathcal{A} is a self-adjoint operator.

It is shown that the operator

is bounded and its norm is

where \mathcal{B} is a self-adjoint operator.

It is also shown that

where \mathcal{C} is a self-adjoint operator.

Finally,

we have

P R E F A C E.

FORMERLY, when modern languages were unimproved, and when, from the small number of persons who devoted themselves to scientific researches, it was expected that almost every essay would be read by people of different nations, it was customary to write in the Latin; but as I have not the vanity to suppose this Thesis will be seen where the English language is unknown; and as several persons, eminent for their knowledge in every branch of useful literature, have thought the making of the dead languages the vehicle of any communication to the publick incompatible with the present state of science in America, I hope I shall be excused for having embraced their sentiments; more especially as the college, dispensing with a long established rule by leaving it 'at the option of the 'candidate,' appear to have adopted the same opinions.

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PHTHISIS PULMONALIS,
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THE PHTHISIS PULMONALIS has so long baffled the skill of physicians, that some may be disposed to believe it owing to the absolutely incurable nature of the disease that so many are yearly made its victims.

THE medical science, though within these few years greatly improved, is far from having arrived at perfection; it will therefore be readily allowed that the subject of this inquiry is not completely understood. We ought not to be deterred from the search merely on account of its difficulty, or because, in the long lapse of time since this disease has been observed, so little progress is yet made towards
treating

treating it successfully. The many and great recent discoveries in every branch of medicine are sufficient to urge us to inquiry and stimulate us to industry: * ‘ A physician,’ says Dr. Rush, ‘ should consider his obligations to his profession and to society as undischarged, who has not attempted to lessen the number of diseases deemed incurable.’ These are my apologies for choosing this as the subject of an inaugural dissertation; they are such as I presume the liberal will approve, and, though I should fail to point out a practice more productive of advantage than what has hitherto been in use, there is some merit I hope in the well-meant attempt.

SHOULD I, in some particulars, step aside from the most commonly received opinions on this subject, it will not in this audience, I am persuaded, be attributed to affectation or the vanity of appearing singular. It is with the greatest diffidence that I enter upon a subject confessedly so difficult, especially when it is considered that, after all the labour which has been bestowed upon it by men deservedly eminent for medical abilities, a successful method of treating the disease is not fully ascertained.

THE

* Medical Inquiries and Observations.

THE PHTHISIS PULMONALIS makes its attack in a very gradual and almost imperceptible manner. It is discoverable by a languor, aversion from motion, fatigue from trifling exertions of body or mind, great sensibility to variations in the atmosphere, coldness of the feet, respiration easily hurried by exercise even though slight, frequent palpitations, feverishness after eating, especially if more food is taken at once than ordinary. After these symptoms have subsisted for some time, which varies in different instances, a slight cough comes on scarcely attended to by the patient, nor is it accompanied with any expectoration: this cough sometimes continues for a year or more; at length it is accompanied with a spitting, which appears to be merely a vitiated mucus: the plumpness of the body suffers a gradual diminution, and pains are frequently felt in different parts of the thorax, chiefly under the sternum. The cough now becomes troublesome, especially at night, with a sensible increase of the pulse towards evening. The matter discharged from the lungs recedes gradually more and more from the appearance of mucus, and little particles of a greenish pus are discovered, for the most part surrounded with a larger portion of the other sputa. The frequency of pulse becoming more remarkable, a regular hectic is formed, having two exacerbations every twen-

ty-four hours, preceded by chills more or less distinct; and the evening exacerbation terminating in a sweat which commonly begins about midnight or a little after, and continues two, three or more hours. The extenuation of the body together with the cough and discharge from the lungs go on increasing while some degree of œdema appears in the ankles: at length a soreness of the mouth makes its appearance, and shortly after the sweating is succeeded by a diarrhœa. As this advances the cough and expectoration are sensibly diminished. The diarrhœa continuing and becoming in its progress more violent soon exhausts the small remains of strength, and death kindly steps in to close the languishing scene, but not before the body becomes so completely emaciated as to exhibit the appearance of a mere skeleton covered with skin. In some part or other of the disease, it frequently happens that blood is thrown up. This succession of symptoms generally consumes a considerable length of time, but does not observe any uniformity in this respect: not unfrequently many years elapse before the final catastrophe.

By the generality of physicians the PHTHISIS PULMONALIS has ever been considered as, in its first appearance, entirely local,
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and the disorder of the system a consequence only of the topical affection. Upon a more strict inquiry perhaps it may be reasonably suspected that this opinion has been adopted without satisfactory proof, and that many reasons may be adduced which will render it probable that the disease is of a general nature, even in its very commencement.

I. FROM the description given, there may be observed, before the lungs are affected, various symptoms, such as languor, aversion from motion, fatigue from trifling exertions, &c. that mark a general disease, and that never fail to precede the topical injury.

II. ALTHOUGH, while life continues, the lungs are kept in constant action, yet innumerable observations teach us that they may be ulcerated without producing phthisis. Abscesses in the lungs, from pneumonic inflammation, seldom occasion a phthisis, and I believe never but where a predisposition exists. Wounds penetrating the cavity of the thorax and entering the lungs, produce ulceration, but such wounds, with the above exception, readily admit of being healed. I myself have seen several instances where musket balls have passed quite through a portion of the lungs, and the patient notwithstanding recover.

III. THE consumption attacks especially persons of long necks, narrow chests, prominent shoulders, whose limbs are long in proportion to the trunk of their bodies, who have florid complexions, blue eyes, soft light coloured hair, * fine teeth, and who in their childhood have been subject to † strumous swellings. Women are more frequently affected with it than men. It may occur at any period of life, but most frequently it shews itself between puberty and the thirty-fifth year of the age. People in the advanced stages of life are sometimes, though rarely, attacked by it, and there have been instances of ‡ children dying of confirmed phthisis before a month had elapsed from their birth.

IV. THE different stages of society influence this disease very much. § We are assured that among the Indian tribes the PHTHISIS PULMONALIS is entirely unknown; that the frontier settlers are seldom afflicted by it; that in long-cultivated countries it is more common; and that in cities, if we except the epidemics, it is among the most frequent complaints.

FROM his very birth the savage is subjected to those causes which produce a vigorous and robust

* Dr. S. F. Simmons. † Dr. Meade. ‡ Reid, on pulmonary consumptions. § Rush's Medical Inquiries and Observations,

robust constitution : his principal occupations are hunting and war : he is exposed with very little covering to every variety of weather which occurs even during the most inclement seasons of the year, and his diet is of the most simple kind ; hence his body becomes firm, and capable of sustaining the most incredible exertions.

THE first settlers, as they are called, spend their lives in circumstances not very dissimilar from the native inhabitant of the forest. The scarcity of stock obliges them to depend principally upon their guns for food : they are frequently called out to protect their families from the hostile incursions of savages : they live in houses, perhaps the rude structure of their own hands, with interstices open to every wind that blows, and are obliged to clear their land of vast incumbrances, generally with very little assistance, before they can plant a potatoe or raise a bushel of corn : even the females, partaking of these labours, may every where be seen lending their aid to subdue the stubborn soil.

IN places where civilization has made considerable progress, as in long cultivated countries, most people have the means of indulgence in their power, wherefore laborious exertion gives place to indolence and a variety
of

of excesses which tend directly to weaken the powers of the body: those of the more delicate sex especially, partly from choice but more from habit and a kind of necessity, lead a sedentary life, while at the same time their diet, much of which consists of warm watery substances, produces a very considerable degree of laxity in the solids.

As society advances towards its greatest refinement, if we trace its steps to the city, we shall there see the body suffering under the accumulated evils of impure air, unhealthy lodgings, business which confines a person to one fixed spot and that frequently below the surface of the earth, improper food, bad water, irregular hours, and a variety of other debilitating causes, which, continued through a number of generations, form at length that habit of body which gives the hereditary predisposition to phthisis, and which consists especially in a *general laxity and debility of the muscular fibres*.

THAT such a general atonia does exist, is inferred from considering the particular description of persons who are most obnoxious to the disease; from the great irritability and sensibility of such persons; from their being unable to bear cold; from their being subject to hæmorrhages:

hæmorrhagies: the mind also, partaking of the delicacy of the body, is quick in all its operations, variable, unsteady, and seldom capable of long-continued application: but especially from observing its progress in the different stages of civilization.

THE exciting causes also are such as act by increasing the predisposition, and not from any local effect upon the lungs. It is difficult to conceive how long-continued fatigue, night-watching, too close application to business or study, frequent intoxication, imprudent exposure to cold and moisture either separately or conjoined, excess in venery, deficient exercise, and the sedative passion of grief, &c. which are the occasional causes of consumption, should produce a partial injury.

IF, from the arguments advanced, we may conclude that the phthisis is a general and not a local disease—that it may be doubted if it ever happens without an evident predisposition; and if this predisposition is truly attributed to a loss of tone in the solids, may it not justly be inferred, that, if the predisposition be removed, the consequence of it, viz. phthisis, cannot take place?

IN order to remove the predisposition, there can be but one general indication—*to restore to the solids their healthy tone*; which there is much reason to believe may be done in the generality of instances, and it is perhaps only when proper assistance has been delayed until the disease is so far advanced as to affect the lungs that it becomes incurable. In a complaint of this nature, which attacks chiefly the most promising part of our species, it is impossible to be too circumspect: at one time it may very probably be removed, but, that time being passed, returns no more, and all that the physician can then do, is, to smooth the rugged way to the grave. The celebrated * Dr. Cullen is of opinion, that a phthisis, when it arises from a hereditary taint, and has proceeded so far as that a purulent expectoration shall have come on, will almost certainly prove fatal.

THE strength of the muscular fibre is to be restored by an attention to,

1st. THE air we breathe.

2dly. THE kind and quantity of exercise we use.

3dly. To diet.

4thly.

* First Lines of the Practice of Physic.

4thly. To sleep.

5thly. To the passions of the mind.

AND, 6thly, by the employment of tonic medicines.

1st. THAT air should be chosen which is dry and pure: a country abounding with hills therefore, and remote from the sea, should be preferred. The temperature of the air also demands attention; it should be as uniform as possible. Sudden transitions from heat to cold are very pernicious, and should be cautiously guarded against by such clothing as is best calculated to promote an equable perspiration. With this view the wearing of flannel next the skin at all seasons of the year, but especially during the variable weather of spring and autumn, will be found highly advantageous.

2dly. EXERCISE is a most important article in the prevention of consumption. It has been justly observed, that this disease is least known where the body is most inured to exercise. Without a proper attention to exercise, that strength in the solids, in which alone an exemption from phthisis is to be found, will be looked for in vain, notwithstanding every other means that may have been employed. Exer-

cise should always be performed in the open air, and that kind which strengthens the body in general, while it acts more especially upon the thoracic and abdominal viscera is to be preferred. So very efficacious has this kind of exercise been deemed, that some have rested the cure of phthisis, even when far advanced, upon it alone. * ‘ I consider riding on horseback,’ observes Dr. Sydenham, ‘ as efficacious in the cure of consumption as the peruvian bark in intermittents.’ The occupations of a farm, at the same time that they afford a most pleasing and rational amusement, seem to be in a peculiar manner adapted to obviate the predisposition to phthisis: even the most laborious parts of farming are not to be avoided, care only being taken to continue them no longer at a time than the body can sustain without bringing on much fatigue.

FROM the history of the progress of phthisis, it might be concluded that a savage life, could that be adopted, would be the most certain means of conquering the phthisical diathesis. That such a mode of life has succeeded, there are several well-authenticated facts to prove: but long-continued experience has fully ascertained, that all † violent and sudden changes are attended with danger. The constitution, debilitated by the causes mentioned above,
and

* Processus Integri.

† Hippoc. Aphor.

and those causes continued perhaps through several generations, would, in most instances, be destroyed by such an attempt. Where it is intended to bring about so total a revolution, we should proceed cautiously: every thing of this kind ought to be progressive: the human constitution is not all at once destroyed: probably even several ages may be necessary so far to weaken the original stamina as to admit of a hereditary predisposition to consumption, and which cannot therefore by any means be immediately removed. For this purpose it is and ever will be found necessary, to persevere through a series of years, and, in some particular instances, even ages, in order to eradicate a predisposition which has become strongly hereditary.

3dly. FROM several considerations it may be inferred, that the author of nature designed a mixed diet for the sustenance of man. I am well persuaded therefore that a diet entirely vegetable is apt to weaken the digestive powers, and produce a morbid acidity. It has been very constantly observed, that those are most robust and healthful who live on a diet composed partly of animal and partly of vegetable substances; we may thence conclude with much certainty, that food of this kind will be more readily converted into such juices as are necessary for the nourishment of the body. Those animal substances which are allowed,

lowed, should always be eaten with a due proportion of vegetables, and not in large quantities at a time. In the choice of meats it may be found necessary to select those only which are most easily digested, at least until, from a proper course of exercise, &c. the body shall have acquired sufficient strength to bear the more gross kinds of flesh: and those inflaming ingredients, with which the art of cookery has contrived to stimulate the appetite beyond the natural calls of hunger, are to be studiously avoided. By neglecting these precautions, and not from the nature of animal food, it is that such aliment becomes injurious.

FROM several striking instances that have occurred to myself, and from a variety of facts that have been communicated to me by gentlemen of observation, as well as from the opinion of several writers, I am induced to believe, that some fermented liquors may not only safely but also advantageously be allowed: the beneficial effects of porter I have in some cases seen remarkably exemplified.

4thly. PATIENTS should accustom themselves to regularity as to sleeping and waking. Lying long in bed in the morning is exceedingly pernicious. A feather bed, especially in summer, ought to be shunned, and a good mattress substituted in its place; for the warmth of a
feather

feather bed is apt to induce profuse, and therefore an improper degree of perspiration, the effect of which upon the general health is sufficiently known, and so universally acknowledged, as not to need a particular discussion.

5thly. THAT a due attention to the state of the mind is essentially requisite cannot be doubted, if we consider the great number who die of phthisis brought on by this cause alone. Of all the affections of the mind, the most sedative, and generally the longest in duration, is grief; hence it tends directly to induce that state of the solids which favours so much the attack of phthisis. Those who are said to die of a broken heart, do all of them die evidently consumptive.

ALTHOUGH this is clear even to demonstration, it is to be regretted that there is but very little probability of our being able to remedy it. There is such a propensity in the mind to indulge melancholy reflections, such a species of mournful pleasure in dwelling on past misfortunes and brooding over the infelicities of life, that, like intoxication, it infatuates the senses, and renders them incapable of every considerable exertion. You may frequently convince a man's reason that the imprudent indulgence of grief is baneful to his constitution, and will pretty certainly destroy his health,

health, yet will his practice seldom be influenced by it; still he will fly the cheerful haunts of society, still seek for happiness in solitude and pensive contemplation, and too often not all the entreaties of friends, the interest of his family, the judgment of physicians, nor even the influence of the strongest conviction can tempt him to forego this (shall I call it criminal) indulgence of a passion ruinous to his constitution, and unfriendly even to his morals.

It is surely as much a duty to endeavour to regain our tranquility, as to take nourishment, or defend the body against the chilling blasts of the winter. For this purpose it is necessary to avoid all opportunities of being long alone. Solitude, which too much disposes to gloomy reflections, is to most people an enemy to cheerfulness: company should be frequented, and that should be preferred of which vivacity is the strongest characteristic, and the mind courted to engage in the general hilarity; thus situated, it is indeed difficult to be long unconcerned at what seems so much to contribute to the enjoyment of all around. The pleasures of hunting and fishing, where these are practicable, are great promoters of cheerfulness: a melancholy sportsman is rarely to be found. Long journies and voyages, especially when accompanied with some difficulty,

culty, often engage the attention, and, by turning it to external objects, produce very beneficial effects, especially as they necessarily take off the attention from the cares of a family, and are constantly presenting new objects and diversity of scenes well calculated to dispel this lethargy of the mind.

6thly. IN reflecting upon the causes which produce a predisposition to phthisis, and the nature of the predisposition when produced, it appears obvious that, if any benefit is to be expected from medicine, it must be sought for among the class of tonics. Physicians, it is true, have differed in opinion as to the propriety of exhibiting tonics; some esteeming them useful even after the lungs are ulcerated, while others altogether deny their beneficial influence. I believe we may conclude, that it is only when a purulent expectoration has taken place, and consequently, in far the greater number of instances, every remedy must prove ineffectual, that tonics disappoint our expectations.

WHERE it is necessary, as in the present case, to continue the use of such medicines for a length of time, those of the vegetable class are thought best adapted, and of these the preeminence seems justly due to the peruvian bark.

* Tiffot prescribed bark in the quantity of a scruple

scruple three times a day to those patients who were wasting from a purulent expectoration, attended with hectic fever, and recommends the practice from his own experience of its utility. ' In those habitual and frequently returning catarrhs, which depend upon a weak and imperfect perspiration by the skin, and this again upon a *weaker force in the action of the heart and arteries;*' the bark is judged serviceable by
* Dr. Cullen.

As a tonic, I have no doubt of the propriety of using the cold bath, especially if bark may be safely employed: indeed the effect of these will serve to illustrate the principles which I have endeavoured to establish. If these principles be well founded, of which the proofs are numerous, and I think conclusive, tonic remedies cannot fail of being serviceable, and accordingly there are instances upon record of their use having been followed with well marked success.

* *Materia Medica.*

T H E E N D.

Med. Hist.

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